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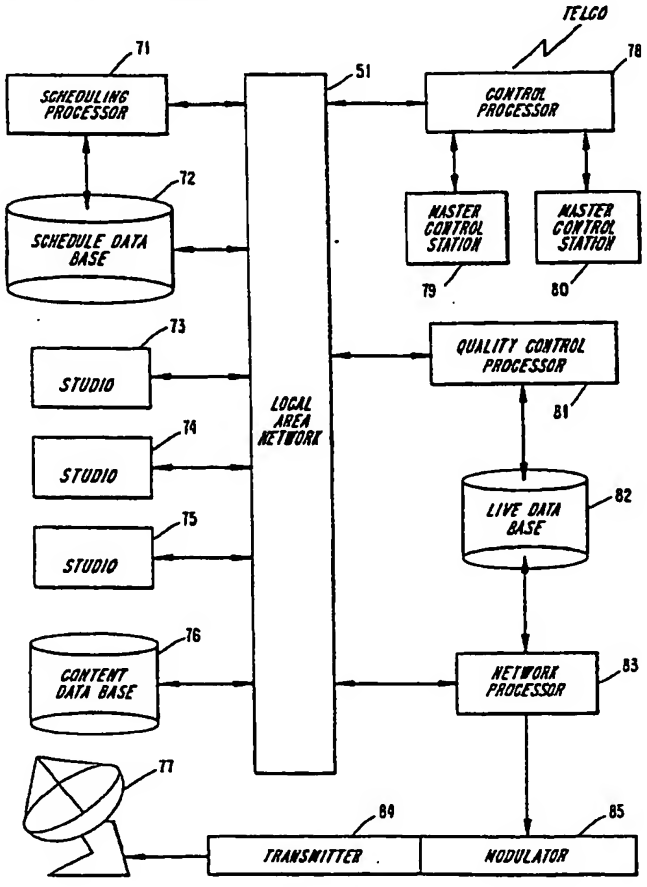
(57) Abstract

A multiple media system having a central site (31) and a remote site (32) for customizing video and audio presentations comprising a communications channel, a studio processor (73), a scheduling processor (71), a network processor (83), a transmitter (84), a communications processor (103), a video processor (111), and optionally a matrix switch (118), a cue processor (116), a matrix-switch processor (117) and a system monitor (512). The studio processor (73) generates one or more content-data signal. The scheduling processor (71) generates a schedule-data signal. The network (73) generates a communication signal which includes the one or more content-data signals and the schedule-data signals formatted with the video signal. The transmitter (84) transmits the communications signal over the communications channel.



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MULTIPLE MEDIA DELIVERY NETWORK METHOD AND APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to television systems and more particularly to a communications distribution system which allows customizing the video presentation at each ground terminal.

DESCRIPTION OF THE RELATED ART

The 1980s have seen an equalization among television sectors. Networks, independents, cable, government supported, pay, and direct broadcast satellite are all merging to be simply "television". Viewers support each medium based upon perceived value versus the cost, either direct cash cost or aggravation costs.

An equally important trend is the consumer's demand that television content relate more directly to a viewer. Local news has increased in value the importance of content that relates to the consumer's personal interest. These trends are documented as network viewership falls and vertical and local offerings increase.

As more "television" offerings come into play with content that is more "local" and "pertinent", a new opportunity is presented to the television industry:

1. Viewers need to easily know what is on television and what content is pertinent to each group.

2. Viewers want content including consumer, business, entertainment, educational information, and advertising that is local and pertinent.

OBJECTS AND SUMMARY OF THE INVENTION

An object of the present invention is to provide a communications system that inexpensively and reliably delivers customized consumer, business, entertainment, education and advertising from a central site to any number of locations in a geographical area.

Another object of the present invention is to uniquely configure the consumer, business, entertainment, educational and advertising communications of each remote site to offer the appropriate services for that particular market.

A further object of the present invention is to control remote sites from the central site by a downlink computer that receives content-data signals, which have consumer, business, entertainment, educational and advertising information unique to a particular remote site.

An additional object of the present invention is to customize consumer, business, entertainment, educational and advertising communications at a remote site, using the downlink computer and the content-data signals, and as appropriate, combine the customized content-data signals with locally originated content-data signals.

According to the present invention, as embodied and broadly described herein, a system having a central site with headend equipment and a remote site with downlink

equipment for customizing consumer, business, entertainment, educational and advertising information for television or other display medium using a video signal, is provided comprising a communications channel, studio-processor means, scheduling-processor means, network-processor means, transmitting means, communications-processor means, first storing means, second storing means, an input source, audio-processor means, video-processor means, a matrix switch, cue-processor means, and matrix-switch-processor means. The matrix switch and matrix-switch-processor means are optional, and would be used when multiple sources and/or multiple outputs are employed.

At the central site, the studio-processor means generates a plurality of content-data signals. The content-data signals may include analog or digital text signals, phototext signals, and/or audio signals. The content-data signals are stored in a content-data base. The scheduling-processor means is located at the central site and is coupled to the studio-processor means. For each of the plurality of content-data signals, the scheduling-processor means generates a schedule-data signal. The schedule-data signal includes a unique identifier, accounting, administrative and scheduling data. The network-processor means is located at the central site and generates a communications signal which includes the plurality of content-data signals and the schedule-data signals, and which may be formatted with a video signal. The transmitting means is located at the central site and

transmits the communications signal over the communications channel.

At the remote site the communications-processor means receives the communications signal and, using the control-data signal, selects a first content-data signal from the plurality of content-data signals, targeted for the remote site. The first storing means is coupled to the communications-processor means. The first storing means stores the video signal. The second storing means is coupled to the communications-processor means. The second storing means stores the first content-data signal. The input source, which is optional, is the source for an audio signal.

The audio-processor means is coupled to the second storing means and the input source. The audio-processor means mixes the audio signal with the first content-data signal to generate an output-content signal. The video-processor means is coupled to the first storing means and the audio-processor means. The video-processor means, mixes the video signal with keyed graphic or character information. The matrix switch is coupled to the video-processor means, the audio-processor means and a plurality of network communications channels. The cue-processor means is coupled to network feed channels through the matrix switch. In response to detecting network-cue signals, the cue-processor means generates insertion-cue signals. The matrix-switch-processor means is coupled to the matrix switch. The matrix-switch-processor means, using the

insertion-cue signals, controls the matrix switch and routing of the video and audio signals, the output-content signal and a synchronization signal to a network communications channel.

Additional objects and advantages of the invention are set forth in part in the description that follows, and in part are obvious from the description, or may be learned by the practice of the invention. The objects and advantages of the invention also may be realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate preferred embodiments of the invention, and together with the description serve to explain the principles of the invention.

FIG. 1 shows an overview of the multiple media delivery network of the present invention;

FIG. 2 depicts the multiple media delivery network architecture;

FIG. 3 is a block diagram of the multiple media delivery network headend architecture;

FIG. 4 is a diagram of headend functions;

FIG. 5 is a block diagram of the multiple media delivery network downlink architecture; and

FIG. 6 is a diagram showing downlink functions.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference is now made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals indicate like elements throughout the several views.

The present invention comprises a central site and any number of remote sites. The invention is capable of utilizing broadcast protocols: band-edge, sub-carrier, and vertical blanking intervals. The transmission speeds can be any speed, but in one preferred embodiment, the speed may be varied between 9,600 bits per second and 1,550,000 bits per second. The decision of what protocol, and hence what speed, to use is based on the cost of the communications processor, the transmission reliability required, and the volume of the content-data signals.

FIG. 1 illustratively shows an overview of the multiple media delivery network of the present invention. The multiple media delivery network distributes television and customized video and audio presentations from a central site through a communications channel such as a satellite network, cable network, fiber optics network, radio wave network or any other type communications channel to remote sites. More generally, the multiple media delivery network can distribute consumer, business, entertainment, educational and/or advertisements signals, which may be customized, from a central site to one or more remote sites. A central site London 31, by way of example, originates

television commercials for transmission through a communications channel shown as a satellite 30 and for delivery to remote sites, which are facilities such as the Birmingham remote site 32, and the Zurich remote site 33, for example. The central site may also serve as a remote site. The remote site may couple into cable systems, hotels, or other rebroadcast systems, including VHF or UHF channels, fiber optics networks. The remote site, using content-data signals, tags each signal which has been delivered from the central site. Tagging a signal includes taking a primary signal, such as a video signal, and converting or customizing the primary signal into a signal for particular location by adding a specific content-data signal. The content-data signals may include graphics, text, photographs or audio tracks. The tagged presentations or signals look like local presentations or signals, and are automatically inserted into the communications networks.

Distributed video presentations may be tagged by satellite footprint, such as North American or Pan European. The distributed video presentations may also be tagged: by language, such as all French speaking areas; by country, such as West Germany; by area of dominant influence, such as Washington, D.C.; by cable system, such as Aberdeen; by hotel, such as the Savoy; or by any desirable criteria.

The multiple media delivery network of the present invention allows customized television signals video content by adding text in any language, adding graphics, replacing the audio track with a different language, or adding full

screen tags. The customization, in general, is accomplished using computers, although specialized processors could be built to accomplish the same means and functions. All tags, i.e., the cutomizations, may be in digital or analog format. Customization occurs at each remote site when the content-data signals are applied to the full motion analog or digital commercial. Video content is defined herein to mean video signals as used for television, computers, and other video interface medium.

The multiple media delivery network inserts customized multiple media signals into satellite networks. A central scheduling system determines which multiple media signals play on which networks, in what daypart or precise time, in which cable system/hotel, etc. The computer at each remote site executes its schedule. Actual insertion of customized content-data signals is triggered by data cues initiated, for example, by each satellite network. Affidavits are automatically logged and transmitted back to the central site, which allow for a "ONE BUY, ONE BILL" operation.

As illustratively shown in FIG. 2, the multiple media delivery network architecture may include a central site coupled through a communication channel shown as a satellite 30 to a remote site. Broadly, the central site includes a plurality of video storage devices shown as video tape recorders 37, a headend computer 36, a studio 38, and a headend antenna 35. the video storage devices may be analog tape recorder, or digital storage devices such a digital tape, disk, laser disk, etc. The plurality of video tape

recorders 37 and the studio 38 are couple to the headend computer 36. The headend computer 36 is coupled to the headend antenna 35. The video tape recorder 37 provides video content such as a video signal, which may be a full motion analog or digital version of a television signal. The video signal may provide consumer business, for entertainment and/or educational information display and listening. Other devices, however, may be used for providing a full motion analog or digital version of a television signal.

The content-data signal, which is the customized material for the video content, is generated at the studio 38. The content-data signal includes, but is not limited to, adding test in any language, adding graphics, replacing the audio track of the video content with another language, adding or replacing video, and adding full screen tags. The studio adds schedule-data signals as digital tags to the content-data signal. The headend computer 36, in general, formats the data signal with the video signal for transmission via headend antenna 35 as a communications signal through satellite 30. Alternatively, the content-data signal may be generated at a central site remote from the site generating the video signal, and transmitted at a time different from, and over a communications channel separate from, that used for the video content. Thus, the communications signal may include the content-data signal and/or the video signal.

In the exemplary arrangement shown, the remote site of FIG. 2 includes one or more video tape records 43, matrix switch 44, universal system platform 42 and downlink antenna and receiver 41. The video tape recorder 43 is coupled to the universal system platform 42, and to the matrix switch 44. The universal system platform is coupled to the downlink antenna and receiver 41.

The downlink antenna and receiver 41 receives the communications signal from the satellite 30. The communications signal passes to the universal system platform 42 and is processed by the communications processor. The video signal portion of the communications signal passes through the universal system platform 42 and is recorded onto magnetic tape by the video tape recorder 43. The content-data signal and schedule-data signal portion of the communications signal is processed by the communications processor of the universal system platform 42. The content-data signal is inserted into the proper video content, which is stored on the video storage device shown as the video tape recorder 43.

In operation, the multiple media delivery network of the present invention, at the central site, receives full-motion analog or digital video content as video signals, designs content-data signals for the video signals. The content-data signals may be either analog or digital, and include text, graphics, full screen tags, and new audio tracks. The content-data signal and video signals are sent to each universal system platform of each remote site. The

communications processor of the universal system platform receives the content-data signals, and the content-data signals are stored on a disk. At a prescribed time, the full-motion video signals, which are the analog or digital video content consumer, educational, entertainment, business or other programs, are transmitted from the headend computer to each universal system platform. The communications processor in each universal system platform receives and tags uniquely each video signal, thereby generating customized video content. The video content are stored on storage devices such as video tape recorders or digital storage including compact disk read only memory or other devices with digital encoding. In response to receiving a cue signal, the universal system platform inserts the scheduled modified signal into a local network.

Headend Architecture

FIG. 3 provides a graphic representation of the headend equipment. The headend equipment incorporates a series of existing devices that are connected over a local area network 51. The center of the interconnected system is a content-data base 76. All content-data signals are tracked from the point of receipt to being broadcast on the communications network.

As illustratively shown in FIG. 3, a central site for customizing video content for a video presentation using a video signal is provided comprising studio-processor means, scheduling-processor means, network-processor means, and

transmitting means. The studio-processor means, scheduling-processor means, network-processor means, and transmitting means may be embodied as studio processors 73, 74, 75, a scheduling processor 71, a network processor 83, and a transmitter 84, respectively. The studio-processor means, scheduling-processor means, network-processor means and a control processor may all be embodied separate processors, or in a single processor which performs all the functions of the studio-processor means, scheduling-processor means, network-processor means, and the control processor depending on particular system requirements.

The studio processor 73 is located in a studio at the central site and generates a plurality of content-data signals. The studio processor 73 digitizes a photograph, provides photographic enhancing, adds text and graphics, and manages the storyboarding of the content. The audio subsystem digitizes audio and allows the creator to integrate the digital audio with the storyboard.

The scheduling processor 71 is located at the central site and is coupled through the local area network 51 to the studio processor 73 and to a schedule-data base 72. In response to each of the plurality of content-data signals, the scheduling processor 71 generates a schedule-data signal, which is stored in schedule-data base 72. The schedule-data base 72 includes scheduling information for merging content-data signals with the video signals. The scheduling processor 71 logs each content-data signal received, assigns a unique identifier, records accounting,

administrative data, schedules, and, if necessary schedules creation work. The scheduling for the network is accomplished based on network availability.

The quality-control processor 81 simulates a downlink system in the field. Each content-data signal is assembled, scheduled and then displayed. Rejected video content is returned to the appropriate creation department. Approved video content is double checked for schedule and control accuracy. Once each piece of video content is totally approved, the quality control processor 81 places the video content as a content-data signal into the live data base 82.

The network processor 83 is located at the central site and generates a communications signal by formatting the plurality of content-data signals and the schedule-data signals with the video signal. The network processor 83 automatically draws from the live data base 82, formats and packetizes the content-data signals, and transmits the content-data signals and schedule-data signals as digital data stream to the modulator 85. The modulator 85 formats the content-data signals and schedule-data signal as a communications signal. The communications signal may include the video signal, content-data signal and/or schedule-data signal.

The transmitter 84 is located at the central site, is coupled to the modulator 85, and transmits the communications signal over the communications channel.

The control processor 78 maintains overall control of the system and dispatches tasks to, and coordinates the

operation of, the other processors. It runs in a completely unattended mode with no local intervention required. The control processor 78 also drives the master control stations 79, 80 that remotely command each remote site.

Headend Functions

Scheduling and control function 50, as illustrated in FIG. 4, include logging each television signal upon receipt, including target audience, display time frames, creation instructions, customizing programs, accounting, and special instructions.

The creation functions include mastering 60 full motion video 59 on to laserdiscs. Each piece of content-data is uniquely identified. The master is expressed to a duplicating facility that in turn expresses the laserdiscs to each remote site downlink. The label contains explicitly instructions as to when the disc is inserted in which machine. A full motion video alternatively be transmitted as a video signal from a central site to a remote site.

A series of studios are connected through the local area network 51. Content-data signals having phototext are created using photographs 52 and a studio 53. When each content-data signal having phototest is completed it is transmitted to and stored in a content-data base 61.

Content-data signals having digital audio are developed from audio script 56 in a sound studio 57 using traditional audio equipment. After the audio track has been 'laid down' on tape, the tape is played into the digitizer 58 and then

into either a studio to combine with phototext 55, or to the content-data base 61.

The quality control functions 62 of the central site include having each content-data signal displayed in a quality control station. When requested by a content provider, the content-data signal is forwarded for review. The approval process can be accomplished by transmitting the content to a remote site equipped with a preview facility. Quality control, after approval, confirms the final schedule and control-data base.

The live data base 63 directly feeds through network management 64 to a modulator which in turn inserts the content into the video signal for transmission to the satellite.

The scheduling and control functions 50 include master control stations at the headend equipment which permit operators to directly dial over standard telephone lines into each remote site downlink equipment. Once connected, the master control station takes control of the downlink equipment at the remote site. A remote diagnostics system checks all functions within the downlink and reports the results to the central site headend equipment. Corrective commands can be issued by the master control stations, including the complete reloading of system software, content, schedules and commands. When hardware failures are detected the headend operator telephones the downlink with specific instructions on how to remove the filed hardware.

The master control stations are also used to retrieve accounting information from each downlink.

Downlink System Architecture

FIG. 5 is a diagram of the processing subsystems that make up the downlink operating environment. It is a real-time process control computer system having a series of parallel processing elements controlled by a master control program running in the control processor 109. Depending on configuration, in a preferred embodiment, from three to sixteen megabytes of high speed main memory are available to the processors. In addition, the system may be supported by 60 megabytes of disc memory which is expandable. The system architecture allocates the various processors into a single system structure to allow powerful asynchronous processing of independent functions thus ensuring adequate processing power and redundancy through a full range of system loading.

As illustrated in FIG. 5, the remote site downlink equipment of the present invention includes communications-processor means, first storing means, second storing means, audio-processor means, video-processor means, cue-processor means, and matrix-switch-processor means, which may be embodied as a communications processor 103, a first storing device 107, a second storing device 105, 108, audio processors 114, 115, video processors 111, 112, 113, a cue processor 116, and a matrix-switch processor 117, respectively.

At the remote site the communications processor 103 receives the communications signal and, using the control-data signal, selects a first content-data signal targeted for the remote site apparatus from the plurality of content-data signals. The communications processor 103 provides the communications front-end for the system. The communications processor 103 receives all incoming communications from the communications data feed, sorts out the portion required for the specific remote site, and ensures that the data are properly formatted and stored in the downlink system.

All data are error detected and corrected within the communications processor 103 prior to being made available to the rest of the system for use by the other processing applications. In addition, a remote control facility 102 is provided through telephone modem communications allowing total control of the downlink system through the communications processor 103 from the headend equipment or any other remote pint. This remote control feature may provide for the following:

1. Remote operation from any location thus allowing the system to be placed in an unattended location.
2. Remote diagnostic analysis directly from the headend equipment in the event of malfunction.
3. Periodic integrity checking of the system from the headend equipment to ensure proper operation.
4. Readout of accounting and logging data on a periodic basis.

The first storing device 107 is located at the remote site and coupled to the communications processor 103. The first storing device 107, which may be embodied as a video tape, stores the video signal which passes through communications processor 103.

The second storing means is located at the remote site coupled to the video processor 113. The second storing means stores the first content-data signal. As illustrated in FIG. 5, if the content-data signal is text and phototext, then the second storing means may be embodied as text and phototext data base 105. If the content-data signal is digital audio, then the second storing means may be embodied as digital audio data base 108.

An input source independently may be located at the remote site and be the source for an audio signal. The audio processors 114, 115 mix the audio signal with the first content-data signal to generate an output-content signal. The output-content signal typically is an analog signal. The audio processors 114, 115 also provide all the processing required for the generation of digital audio and/or the mixing of a combination of digital audio and a continuous analog audio source. The audio processor 114, 115 can receive input data from the audio data base or input fees from an analog source. Audio is output to the system through the matrix switch 118.

The video processors 111, 112, 113 are located at the remote site and are coupled to the first storing device 107. The video processors 111, 112, 113 provide all the

processing required for mixing live video feeds with keyed graphic or character information as well as the generation of local video in the form of phototext. The video processors 111, 112, 113 also provide for a video in the form of phototext. The video processors 111, 112, 113, in addition, provide for a variety of special effects as well as the generation of local video in the form of phototext. The video processors 111, 112, 113 further provide for a variety of special effects, such as animation, as well as significant memory caching in order to allow multiple video images to be operating at the same time. Each of the video processors 111, 112, 113 can receive input data from the video data base or full motion video from laserdisc, video tape or live channel feed. Output of video to the system is effected through the matrix switch 118.

Alternatively, the video processor and audio processor can be used to tag the video signal and content-data signal as they are being recorded on video tape. Such signals can be replayed at a later time and are ready for insertion into the network or other channels.

The matrix switch 118 and matrix-switch processor 117 are optional, and would be used when multiple sources and/or multiple outputs are employed. Similarly, the cue-decoding processor 116 is required if the matrix switch 118 and matrix-switch processor 117 are used.

The matrix switch 118 is located at the remote site and is coupled to the video processors 111, 112, 113 the audio

processors 114, 115 and a plurality of network communications channels.

The cue-decoding processor 116 is located at the remote site and is coupled to network feed channels through the matrix switch 118. In response to detecting network-cue signals, the cu-decoding processor 116 generates insertion-cue signals. The cue-decoding processor 116 provides all the processing required for analysis of all incoming network signals, which may include audio and/or data signals, with detection and discrimination of the coded dual tone multiple frequency (DTMF) or other information. In this manner, valid network cue signals are detected in real-time and directed tot he control processor 109 to schedule insertion activities and operate the matrix switch 118.

The matrix-switch processor 117 is located at the remote site and is coupled to the matrix switch 118. In response tot he insertion-cue signals, the matrix-switch processor 117 controls the matrix switch and routing of the video signal, the output content-data signal and a synchronization signal from a network feed channel to a consumer channel. The matrix switch processor 117 provides for complete status checking and control of the matrix switch 118 used to control the routing of video, audio and synchronization signals, as well as the timing for accurate VBI switching. In addition to switching consumer channels to alternate insertion feeds in various combinations, a variety of options are valuable for headend monitoring. Through the use of video signal fault detection and power

fault detection, the matrix-switch processor 117 ensures that in a "no signal" or power loss situation, the network satellite feeds pass directly through and to, for example, the cable channels, thus protecting the channel from dead air.

At a downlink, the present invention may further include system monitor means which may be embodied as a system monitor 512. As illustrated in FIG. 5, the system monitor can be coupled to the output of any of the video processors 111, 112, 113 and/or any of the outputs of the audio processors 114, 115. The system monitor is added for monitoring the output video or audio such that it can also automatically correct and/or report a quality control deficiency at the remote site or to the central site.

Downlink Function

Content-data signals are transmitted on an on-going basis from the central site to remote sites. The communications processor 103 at each remote site monitors the continuous data stream, selects the data addressed to the particular remote site, and stores the data. The content-data signal can be inserted in any number of networks. A critically important factor is its ability to provide video synchronization to all networks prior to switching thus providing clean VBI switching even when more than one network is being covered at the same time. Two installed laserdisc drives 104, 106, for example, along with discs regularly distributed from the headend, provide full

motion video and audio for "national interest". Optionally a video tape recorder 107 is installed and provides for insertion of locally produce content, or store and forward content, as discussed previously. In addition, phototext insertion of content produced on a standard system can be sued for local insertions. The principle functions of the downlink include the manner in which the system operates as a store and forward system operating a combination of laserdiscs, tapes and at a store on the system disks.

Primary communications is provided through a communications receiver system and communications processor 101. As shown in FIG. 6, the following communications functions 92 are performed:

1. Receive and store scheduling data.
2. Receive and store digital audio for sue in generating local audio.
3. Receive and store video data for use in generating local video and phototext.
4. Receive and store text data for screen tags.
5. Download all system software.

The remote control functions 93 provide for the total control of the downlink system from the headend system. Specifically, the following remote control functions are performed:

1. Remote diagnostics of the local downlink systems from the headend.
2. Operational control of the local system.
3. Readout of all logging and accounting information.

The process control functions 94 are directed by the control processor. The following functions are performed:

1. Management of schedule-data providing for the correct scheduling of insertions in local and national avail slots.
2. System resource allocation providing for the matching of insertion resources (laserdisc, VTR, phototext) against needs to fulfill content requirements on channels.
3. Cue recognition and assignment of available resources.
4. control of the matrix switch to specifically switch content into the covered networks at the appropriate times.
5. Laserdisc control providing for the correct positioning and operation of the available laserdiscs.
6. VTR control providing for the correct positioning of tape and operation of the VTR.
7. Digital audio generation of independent audio or mixing with live network audio.
8. Phototext generation for independent video or keying over live video.

The logging and accounting functions 95 are provided for tracking system activity and recording billable content insertions. The following specific functions are performed:

1. Maintain a log of system activity.

2. Log each individual content insertion successfully supplied for an avail on all covered networks.

All of the above functions interact with memory management 91.

The multiple media delivery network of the present invention is computer based digital communications system. The primary emphasis is transmitting content-data signals and related schedule-data signals for command and control-data. Sample content-data signals include cross channel cable promotions, advertisements, program guides, news, and information programming.

The present invention differs from traditional television networks because the content-data preferably are distributed in a digital format versus analog. This permits the content-data signals to be transmitted at any time, stored in receiving computers at a remote site, and then displayed on one or more channels. Because each remote site is uniquely identified, the content-data signal can be customized to the geographic area in which the content-data signal is displayed. For example, a cable promotion can announce a new program and the computer can customize the promotion with the local channel number and time. In the same manner a standard Ford car advertisement can be customized by the computer with a local sound track and a map to the closest Ford dealer. Both the cable promotion and the Ford ad can be inserted thorough a witch into any number of networks.

The multiple media delivery network of the present invention transmits form the headend equipment frames of video, variable text that can be added to the video, digitized audio, streams of text information, local display schedules, control systems for laser disks and video tape, and the actual software that drives the downlink equipment of each remote site. The transmission schemes vary in speed, but each alternative requires only a small portion of a satellite transponder capacity, reducing space segment cost to under 5% of a traditional video network.

Promotions, advertisements, news and other content is delivered to the headend equipment at a central site either electronically or in hard copy. Full motion video is mastered and laserdiscs are expressed, or are transmitted over a communications channel to each remote site. Content-data signals having phototext are created using a studio. Each unique content-data signal is entered into the scheduling and control system with discrete parameters -- when the content can be displayed, to what demographic audience, in combination with what other content, how the content is customized by the downlink computer, and how the displaying of the content is accounted for.

The multiple media delivery network of the present invention is unique in that the system displays full motion video and audio; replaces an existing audio track with analog or digital audio in another language; overlays customized text on full motion video or phototext content; and customizes phototext content automatically at each

downlink. The content, whether full motion, phototext, digital audio, or any combination is broadcast quality "clean" switch and the content is automatically synchronized to the video signal. The content provider, be it a cable network, an advertiser, new programmer, or television listing service can precisely customize content, display it to exact demographic audiences, and receive a single accounting of the use of the content.

It will be apparent to those skilled in the art that various modifications can be made to the multiple media delivery network of the present invention without departing from the scope or spirit of the invention, and it is intended that the present invention cover modifications and variations of the multiple media delivery network, provided they come within the scope of the appended claims and their equivalents.

WE CLAIM:

1. A system having a central site and a remote site for customizing a video signal comprising:

a communications channel;

studio-processor means located at said central site for generating a plurality of content-data signals;

scheduling-processor means located at said central site, coupled to said studio processor and responsive to each of the plurality of content-data signals for generating a schedule-data signal and a control-data signal;

network-processor means located at said central site for generating a communications signal by formatting the
plurality of content-data signals, a control-data signal and the schedule-data signal with the video signal;

means located at said central site for transmitting the communications signal over said communications channel;

communications-processor means located at said remote site for receiving the communications signal and, using the control-data signal, selecting a first content-data signal targeted for said remote site from the plurality of content-data signals;

first means located at said remote site coupled to said communications processor for storing the video signal;

second means located at said remote site coupled to said communications processor for storing the first content-data signal; and

video-processor means located at said remote site, coupled to said first storing means, and responsive to the schedule-data signal for mixing the first content-data signal with the video signal.

2. A central site apparatus for customizing a television signal having a video signal comprising:

studio-processor means for generating at least one content-data signal;

means for storing each content-data signal;

scheduling-processor means coupled to said studio processor and responsive to each content-data signal for generating a schedule-data signal, respectively;

network-processor means for generating a communications signal from the plurality of content-data signals and the schedule-data signal;

a transmitter for transmitting the communications signal; and

a control processor for coordinating operation of said studio-processor means, said scheduling-processor means and said network-processor means.

3. The central site apparatus as set forth in claim 2 further including a quality control processor for simulating a downlink system by assembling and displaying the content-data signal with the video signal.

4. A central site apparatus for customizing advertising for television using a video signal comprising:

processor means for generating at least one content-data signal, responsive to each content-data signal for generating a schedule-data signal, and for generating a communications data signal by formatting each of the content-data signals and the schedule-data signals; and

a transmitter for transmitting the communications signal.

5. A method using a processor and a transmitter for customizing television signals having at least one video signal, comprising the steps, using said processor and said transmitter, of:

generating a plurality of content-data signals;

generating a schedule-data signal;

generating a communications signal from the plurality of content-data signals and the schedule-data signals; and

transmitting the communications signal over a communications channel.

6. A remote site apparatus for customizing televisions signals using at least one content-data signal, a schedule-data signal and a control-data signal, comprising:

communications-processor means responsive to the control-data signal for selecting a first content-data signal targeted for said remote site apparatus;

second means for storing the first content-data signal; and

video-processor means responsive to the schedule-data signal for mixing the first content-data signal with the video signal.

7. A remote site apparatus for customizing television signals having at least one content-data signal, comprising:

communications-processor means for selecting a first content-data signal;

second means for storing the first content-data signal; and

video-processor means for mixing the first content data signal with a video signal.

8. The remote site apparatus as set forth in claim 11 wherein said second storing means includes a data recording device.

9. The remote site apparatus as set forth in claim 11 further including a control processor for coordinating operation of said communications-processor means, said second storing means and said video-processor means.

10. The remote site apparatus as set forth in claim 13 further including a local area network for connecting said control processor, said communications-processor means, said second storing means and said video-processor means.

11. The remote site apparatus as set forth in claim 11 further including a remote control device for controlling said remote site apparatus from a central site.

12. A remote site apparatus for customizing television signals using a video signal and at least one content-data signal, comprising:

communications-processor means for receiving the communications signal and selecting a first content-data signal;

second means coupled to said communications-processor means for storing the first content-data signal;

video-processor means coupled to said communications-processor means and said second means for mixing the first content-data signal with the video signal;

a control processor for coordinating operation of said communications-processor means, said second storing means and said video-processor means.

13. The remote site apparatus as set forth in claim 16 wherein said second storing means includes a data recording device.

14. The remote site apparatus as set forth in claim 16 further including a local area network for communicating between said control processor, said communications-processor means, said second storing means and said video-processor means.

15. The remote site apparatus as set forth in claim 16 further including a remote control device for controlling said remote site apparatus from a central site.

16. A remote site apparatus for customizing video presentations using a communications signal having a video signal and a content-data signal, comprising:

communications-processor means for receiving the communications signal and separating the content-data signal from the communications signal;

video-processor means for coupled to said communications-processor means mixing the content-data signal with the video signal; and

a control processor for coordinating operation of said commutations-processor means and said video-processor means.

17. The remote site apparatus as set forth in claim 21 further including a local area network for connecting said communications-processor means and said video-processor means.

18. The remote site apparatus as set forth in claim 21 further including a remote control device for controlling said remote site apparatus from a central site.

19. A remote site apparatus for customizing a video presentation having at least content-data signal, comprising:

processor means for mixing a first content-data signal with a video signal;

a matrix switch coupled to said processor means and a plurality of consumer channels; and

matrix-switch-processor means for controlling said matrix switch and routing the video signal and the content-data signal to a particular consumer channel.

20. The remote site apparatus as set forth in claim 26 further including a remote control device for controlling said remote site apparatus from a central site.

21. A remote site apparatus for customizing a video signal using a first content-data signal, comprising:

first means for storing the video signal;

second means for storing the first content-data signal; and

video-processor means coupled to said first storing means and said second storing means for mixing the first content-data signal with the video signal; and

a control processor for coordinating operation of said first storing means, said second storing means and said video-processor means.

22. The remote site apparatus as set forth in claim 28 further including a local area network for connecting said communications-processor means, said first storing means, said second storing means and said video-processor means.

23. The remote site apparatus as set forth in claim 28 further including a remote control device for controlling said remote site apparatus from a central site.

24. An apparatus having a central site and a remote site for customizing a video signal comprising:

a communications channel;

studio-processor means for generating a content-data signal;

scheduling-processor means for generating a schedule-data signal;

network-processor means for generating a communications signal from the video signal and the content-data signals and the schedule-data signal;

means for transmitting the communications signal over said communications channel;

communications-processor means for receiving the communications signal and selecting the video signal and the content-data signal;

first means for storing the video signal;

second means for storing the first content-data signal; and

video-processor means for mixing the first content data signal with the video signal.

25. An apparatus having a central site and a remote site for customizing a video signal comprising:

a communications channel;

studio-processor means located at said central site for generating a content-data signal;

network-processor means located at said central site for generating a communications signal having the video signal and the content-data signal;

means located at said central site for transmitting the communications signal over said communications channel;

communications-processor means located at said remote site for receiving the communications signal and selecting the content-data signal; and

video-processor means located at said remote site for mixing the content-data signal with the video signal.

26. The apparatus as set forth in claim 34 further including:

a matrix switch coupled to said video-processor means, and a plurality of consumer channels; and

matrix-switch-processor means responsive to insertion-cue signals for controlling said matrix switch and routing the video signal with the first content-data signal to a particular consumer channel.

27. A method using a processor for customizing at least one content-data signal and a video signal, comprising the steps, using said processor, of:

receiving the communications signal and selecting a first content-data signal from the plurality of content-data signals;

storing the first content-data signal;

mixing the first content-data signal with a video signal to generate a multiple media signal; and

routing the multiple media signal to a particular consumer channel.

28. A method using a processor for customizing a content-data signal and a video signal, comprising the steps, using said processor, of:

mixing the content-data signal with the video signal; and

routing the video signal mixed with the first content-data signal to a particular consumer channel.

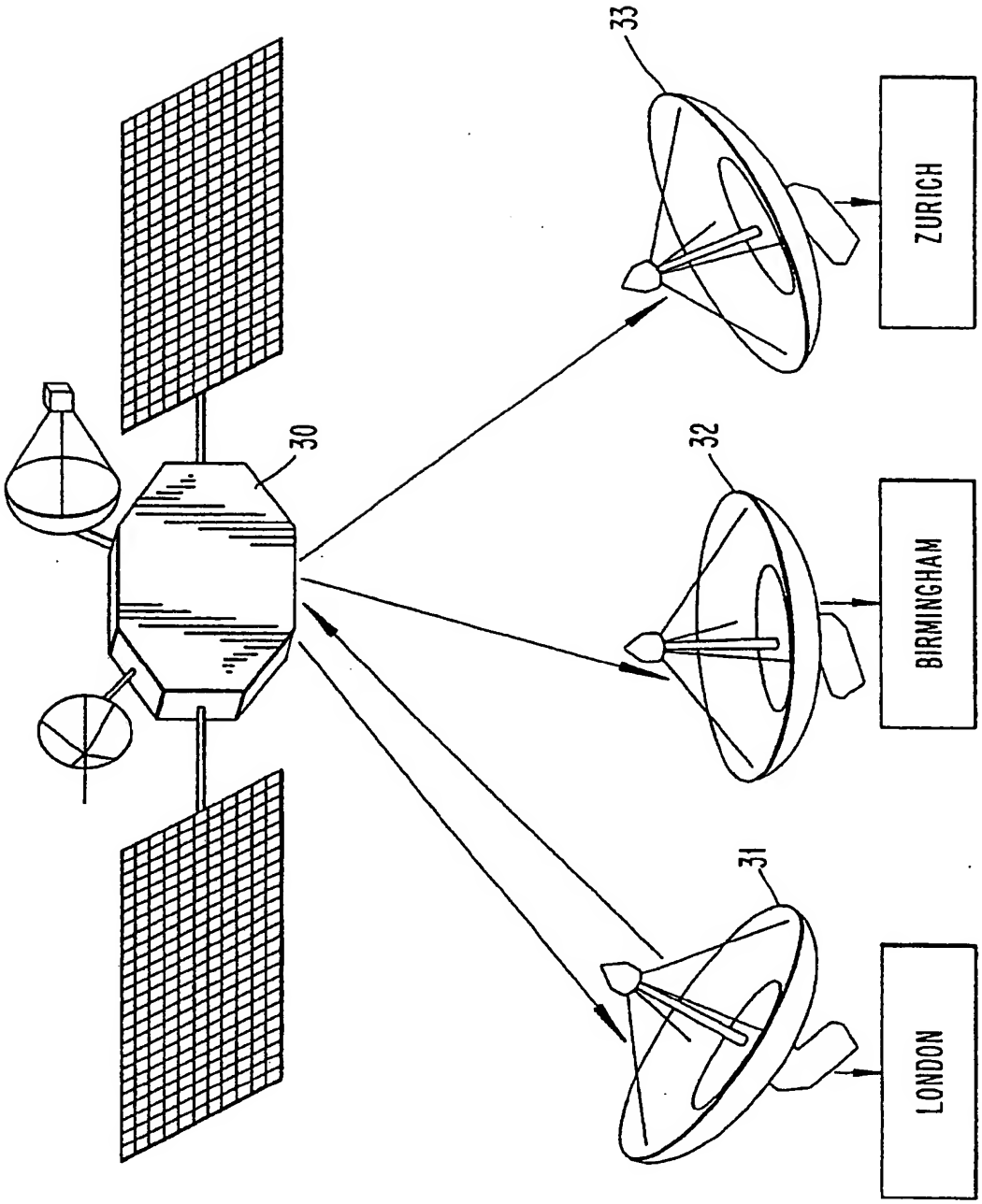
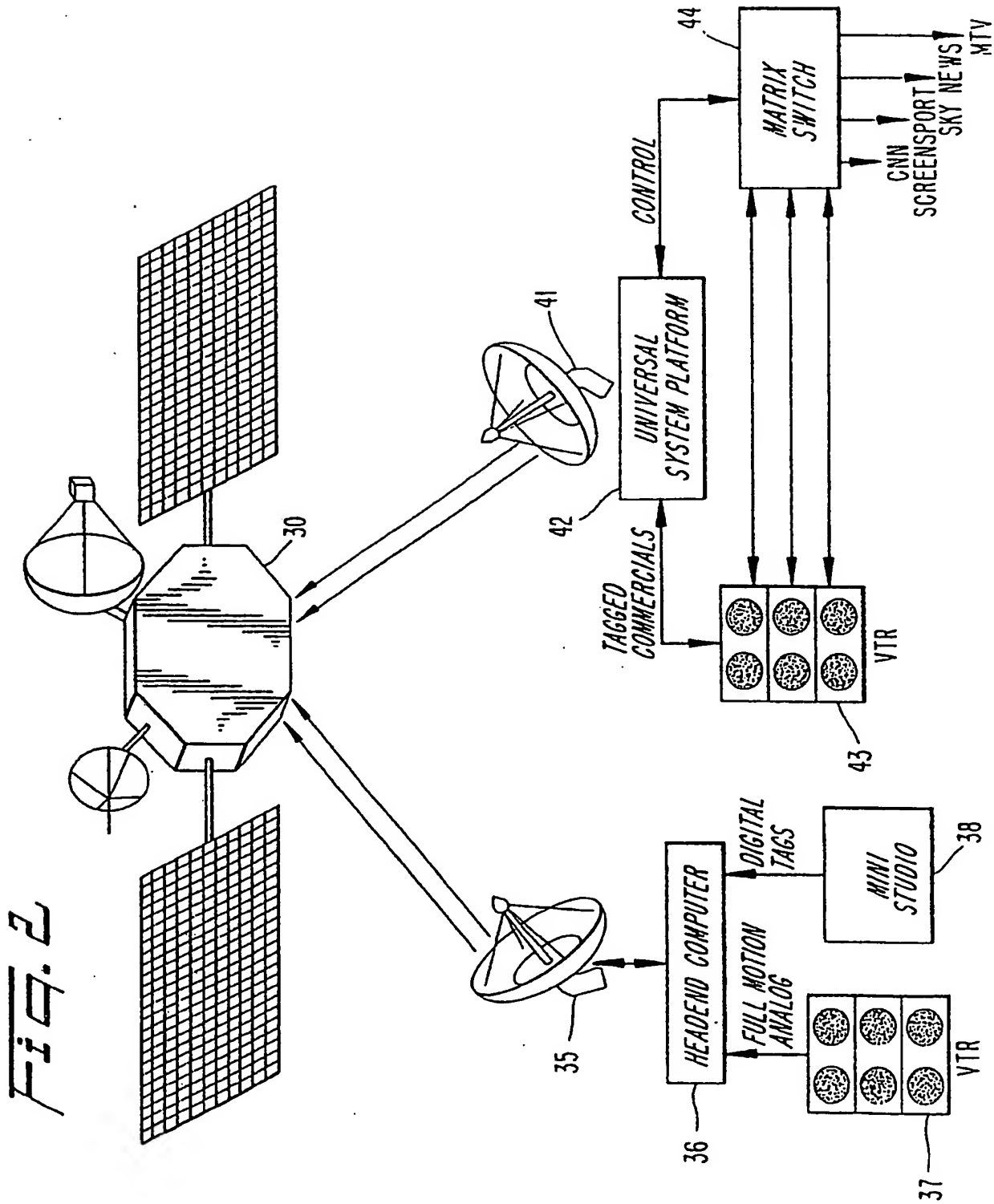


Fig.1


44
MATRIX SWITCH
MTV
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CNN
CONTROL
41
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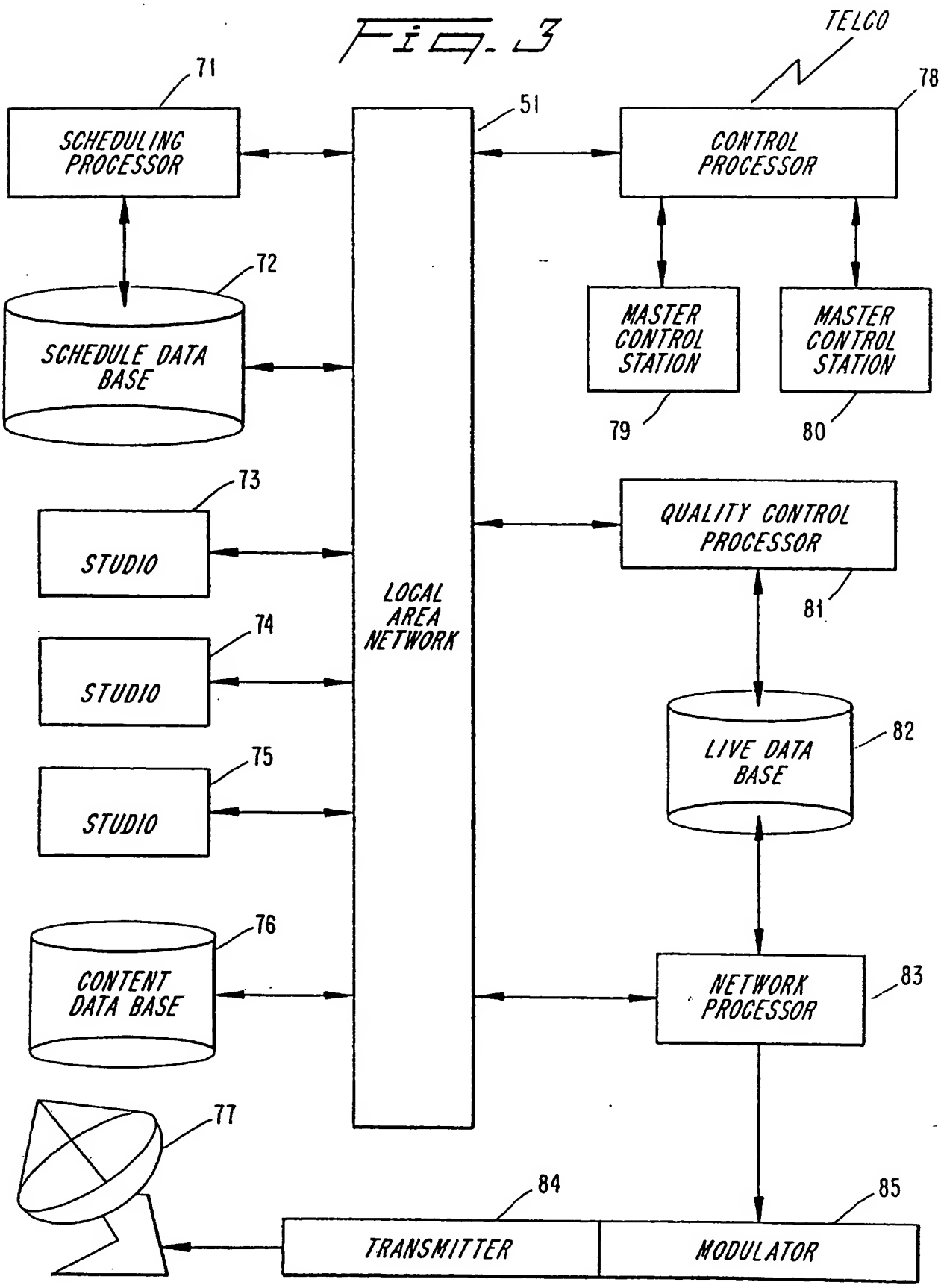
TAGGED COMMERCIALS
VTR
43
DIGITAL TAGS
MINI STUDIO
38
HEADEND COMPUTER
FULL MOTION ANALOG
VTR
35
36
37

Fig. 2

Fig. 3


TELCO
71
SCHEDULING PROCESSOR
51
78
CONTROL PROCESSOR
72
SCHEDULE DATA BASE
MASTER CONTROL STATION
79
MASTER CONTROL STATION
80
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STUDIO
QUALITY CONTROL PROCESSOR
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LOCAL AREA NETWORK
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STUDIO
LIVE DATA BASE
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STUDIO
76
CONTENT DATA BASE
NETWORK PROCESSOR
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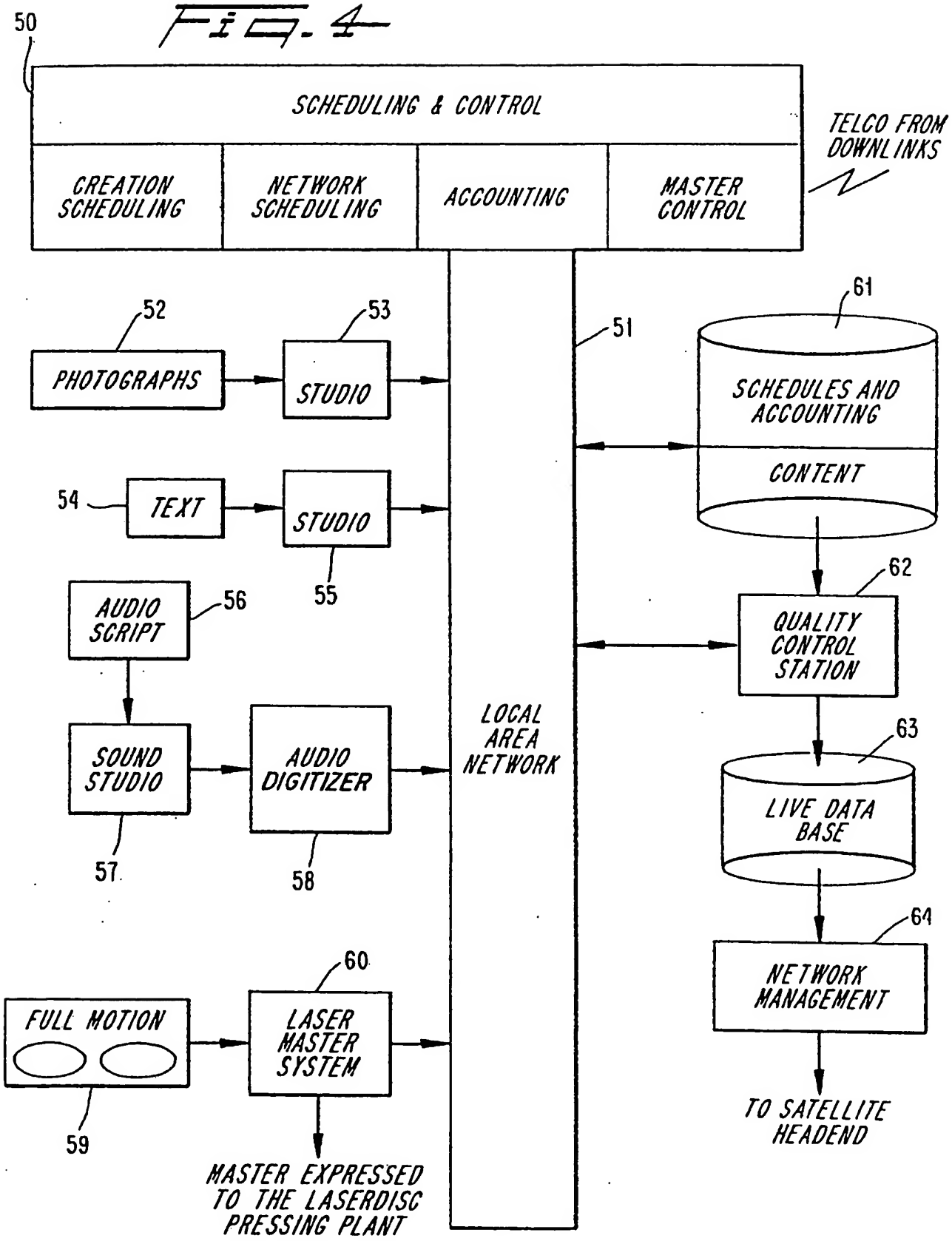
84
85
TRANSMITTER
MODULATOR

Fig. 4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SCHEDULING & CONTROL
CREATION SCHEDULING
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ACCOUNTING
MASTER CONTROL
TELCO FROM DOWNLINKS
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QUALITY CONTROL STATION
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LIVE DATA BASE
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NETWORK MANAGEMENT
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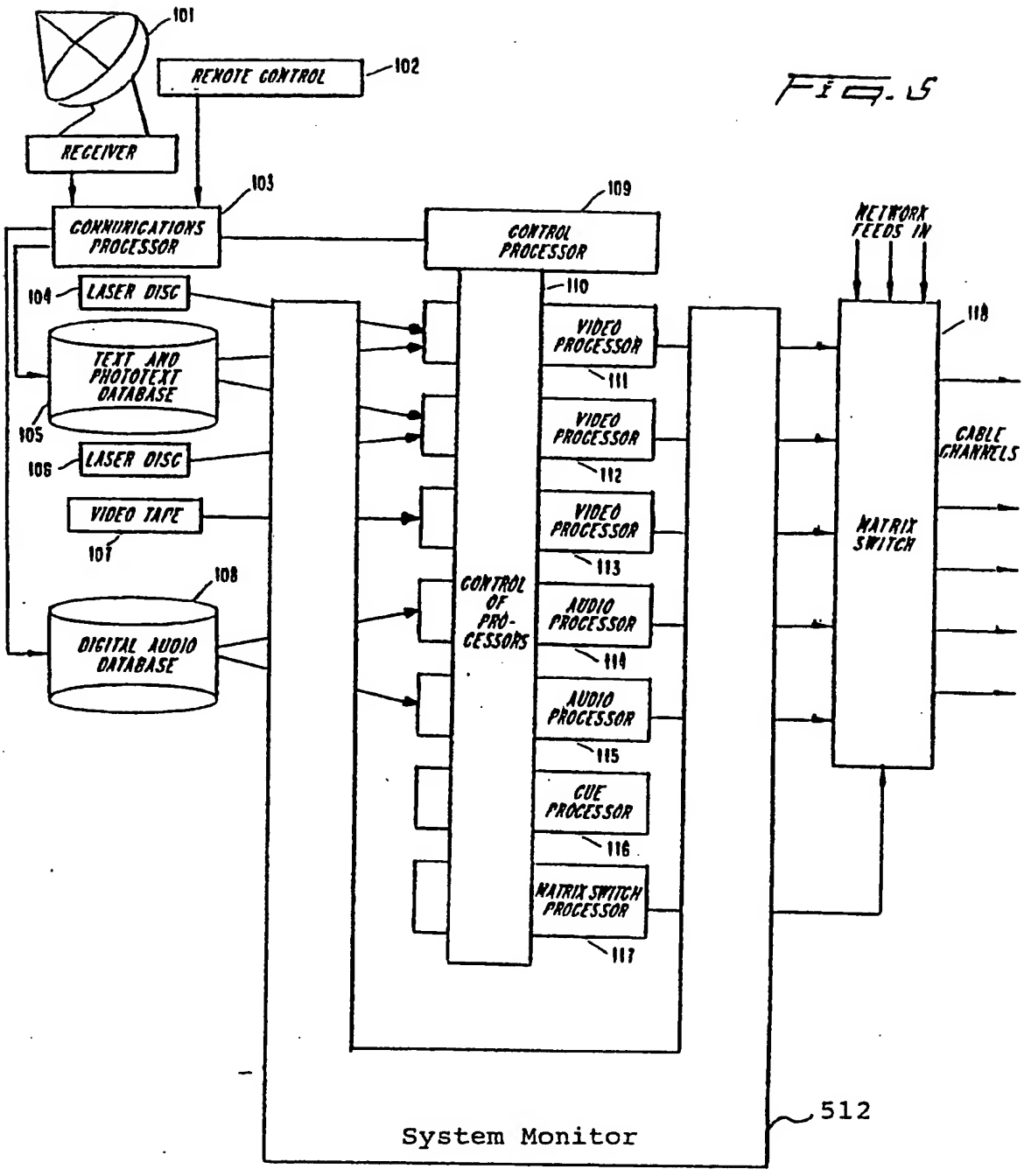
FULL MOTION
LASER MASTER SYSTEM
TO SATELLITE HEADEND
59
MASTER EXPRESSED TO THE LASERDISC PRESSING PLANT


101
REMOTE CONTROL
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RECEIVER
103
COMMUNICATIONS PROCESSOR
109
CONTROL PROCESSOR
NETWORK FEEDS IN
104
LASER DISC
110
VIDEO PROCESSOR
111
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TEXT AND PHOTOTEXT DATABASE
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VIDEO PROCESSOR
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CABLE CHANNELS
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LASER DISC
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MATRIX SWITCH
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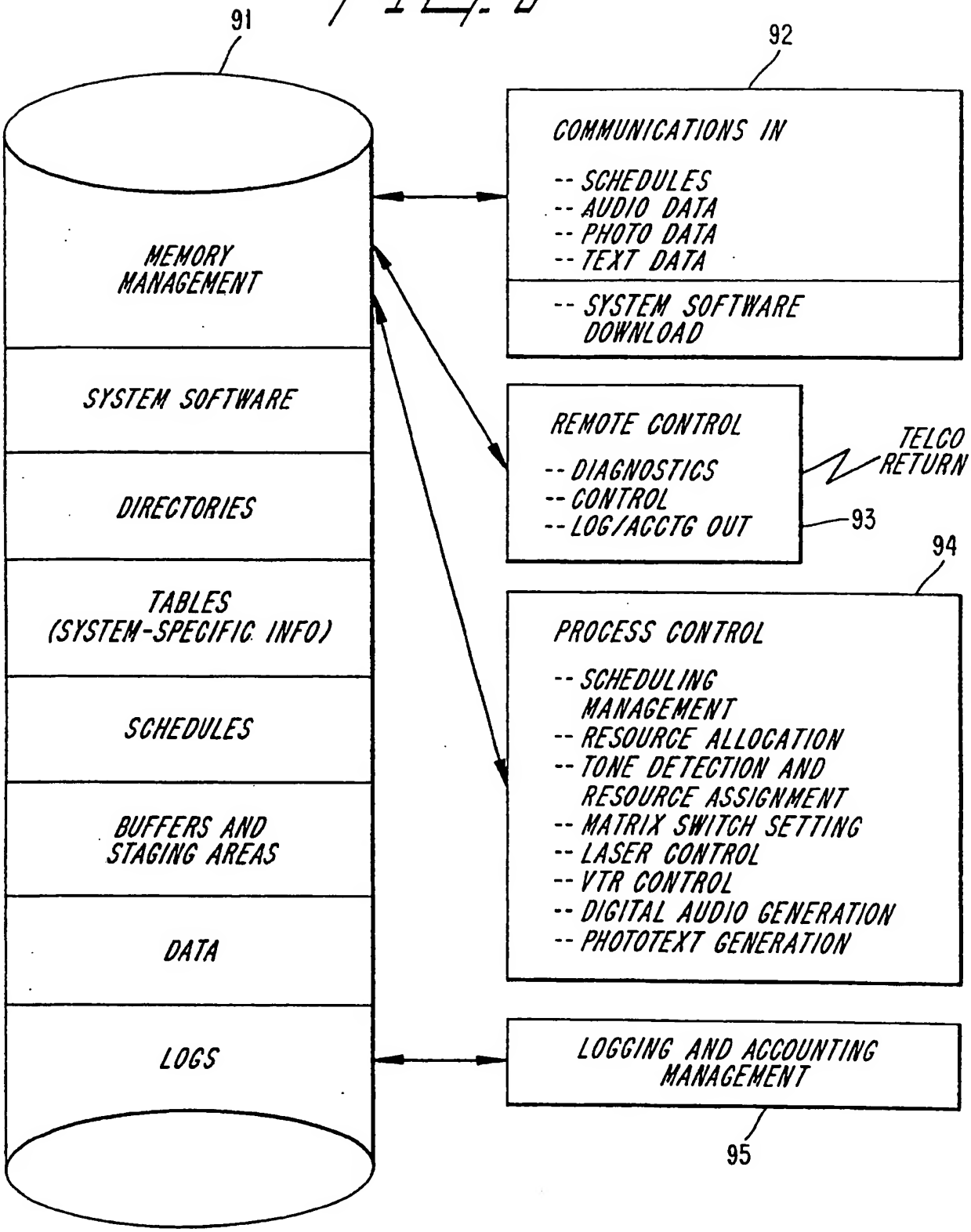
107
CONTROL OF PRO-CESSORS
AUDIO PROCESSOR
114
108
DIGITAL AUDIO DATABASE
AUDIO PROCESSOR
115
CUE PROCESSOR
116
MATRIX SWITCH PROCESSOR
117
512
System Monitor

FIG. 5

Fig. 6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MEMORY MANAGEMENT
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-- MATRIX SWITCH SETTING
-- LASER CONTROL
-- VTR CONTROL
-- DIGITAL AUDIO GENERATION
-- PHOTOTEXT GENERATION
LOGGING AND ACCOUNTING MANAGEMENT
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US92/09919

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :H04N 7/10; H04N 5/222
US CL :358/86,185
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 358/186,181,142 455/6.1,6.3,4.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	US,A, 5,099,319 (ESCH ET AL) 24 MARCH 1992 Col. 1- col. 14, figs 1-6.	1-28
Y,E	US,A, 5,182,640 (TAKANO) 26 JANUARY 1993 Col. 2, line 15- col. 2, line 23.	1-2,4-6,24
Y	US,A, 5,027,400 (BAJI ET AL) 25 JUNE 1991 Col. 3, line 30- col. 4, line 64, figure 1-1-1-6,2-1-2-5,3,4.	1,2,24,25
A	US,A, 4,491,040 (POCOCK ET AL) 10 JULY 1990	1,2,24,25
Y	US,A, 4,894,789 (YEE) 16 January 1990, Col. 2, line 55- col. 3, line 37.	1,6,7,17,24, 25,27,28

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 11 MARCH 1993	Date of mailing of the international search report 14 APR 1993
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. NOT APPLICABLE	Authorized officer JOHN W. MILLER Telephone No. (703) 305-4760

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No
PCT/US92/09919

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
A	US,A, 4,860,379 (SCHOENBERGER ET AL) 22 AUGUST 1989.	1,2,24,25
A	US,A, 4,602,279 (FREEMAN) 22 JULY 1986.	1,2,24,25